# Wildlife Diversity Inventory of

# Bear Hollow Mountain Wildlife Management Area

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Region 2

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Water flowing through the limestone of the Cumberland Plateau has created unique geologic formations on Bear Hollow Mountain Wildlife Management Area and The Walls of Jericho State Natural Area.

Bear Hollow Mountain Wildlife Management Area (BHMWMA) is located on the Southern Cumberland Plateau in Franklin County, Tennessee (Figure 1). The southernmost boundary is the state line of Alabama and Tennessee. BHMWMA is divided into two compartments that, in total, encompass 17,000 acres. The Southern Cumberland Plateau in Tennessee covers portions of Franklin and Marion counties in southern middle Tennessee: (Smalley 1979), which is characterized as having weakly dissected surface and strongly dissected margins and sides (Smalley 1982). Landtypes across this portion of the Southern Cumberland Plateau can be classified into three types, those occurring on the (1) top of the Plateau, (2) sides of the Plateau, and (3) those associated with the drainages (Smalley 1979). The tops of the Plateau contain broad undulating uplands, broad ridges with both north and south aspects, and plateau edges. Landtypes associated with the sides of the Plateau include the sandstone escarpment, talus slopes, benches with north and south aspects, and the lower slopes and benches with north and south aspects. Drainage landtypes include terraces, slopes and stream bottoms with both good and poor drainages.

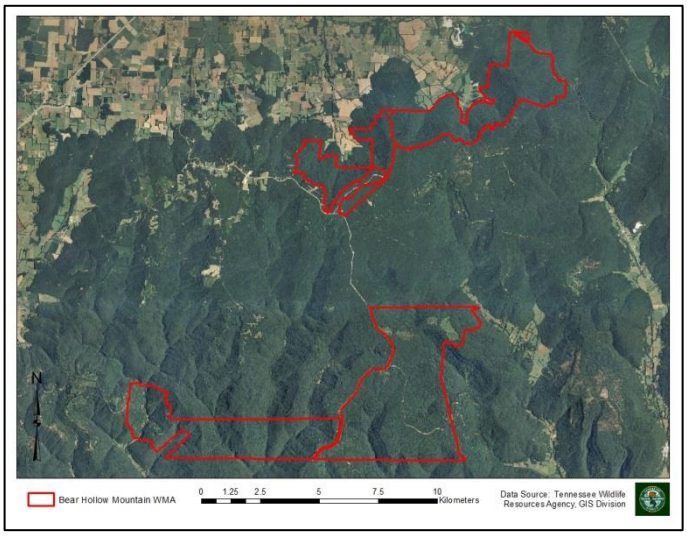



**Figure 1:** BHMWMA is located on the southern Cumberland Plateau in Franklin County, TN.

The location of the WMA is in the more highly dissected portion of the Southern Cumberland Plateau, characterized by deep gorges, vertical escarpment, and undulating surfaces. Because of the dissection, differences in elevation may be as much as 800 feet within three-quarters of a mile (Fox *et al.* 1958). The management area is dominated by a mixed oak and oak-hickory forest on the Plateau top, with mixed mesophytic communities being restricted to coves and gorges (Smalley 1982), similar to other portions of the Southern Cumberland Plateau outside of Tennessee (Wang *et al.* 2010). Hartsells-Muskingum-Cotaco and Rockland, limestone Rockland, and sandstone-Stany soil associations dominate the WMA.

Located within, and sharing boundaries with Bear Hollow Mountain WMA, the

Walls of Jericho State Natural Area (SNA) contains 750 acres of highly dissected portions of the Southern Cumberland Plateau (Figure 2). This SNA boasts impressive geologic formations due to the natural processes caused by Turkey Creek that drains through the area. Numerous rare plant species occur across the SNA, and this is one of only three known locations of the state endangered Limerock Arrowood (*Viburnum bracteatum*) (Tennessee Department of Environment and Conservation 2013). The Walls of Jericho SNA aids in the protection of Turkey Creek and the upper portion of the Upper Paint Rock watershed.

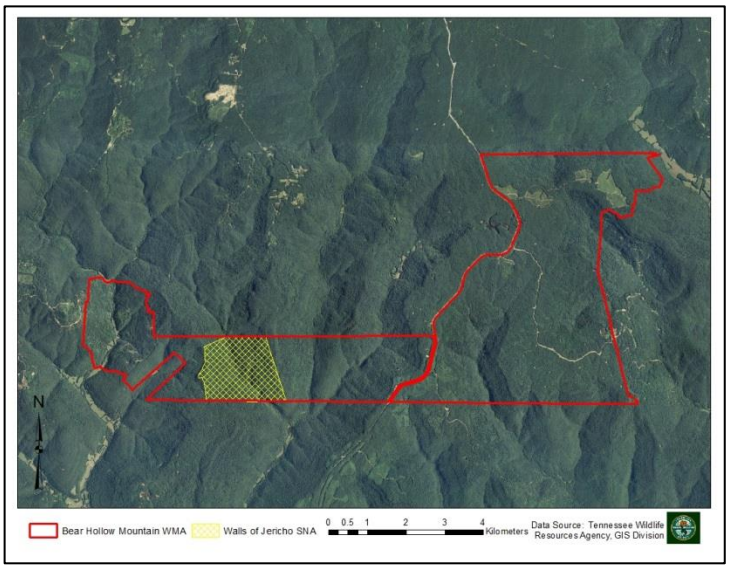
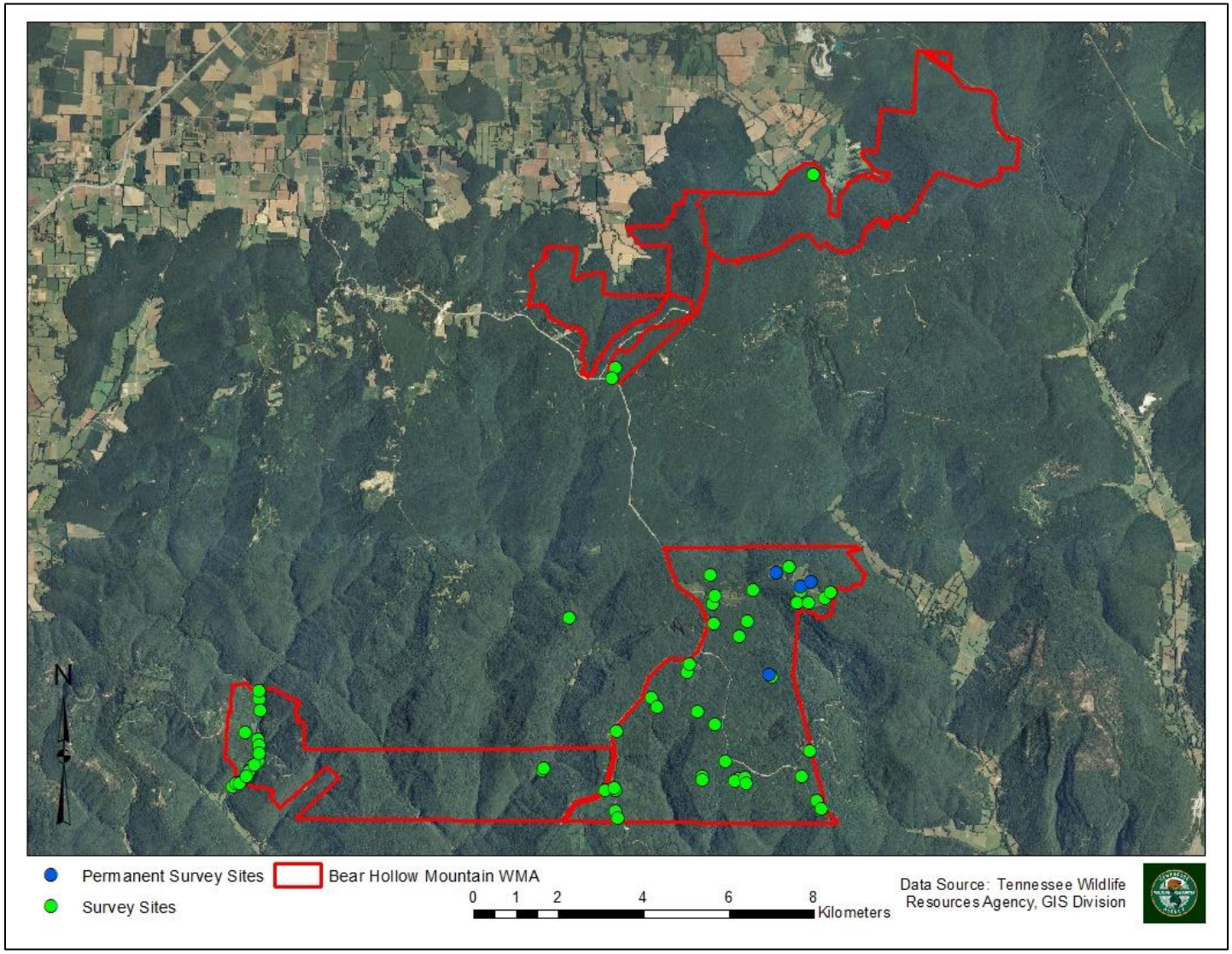



**Figure 2:** The Walls of Jericho SNA is located within Bear Hollow Mountain WMA.

## Wildlife Diversity Surveys

Bioblitzes were used in 2005 and 2006 to conduct rapid assessments of BHMWMA. Surveys occurred intermittently and were species focused until 2009. During these bioblitzes, Wildlife Diversity personnel used small mammal traps, visual encounter surveys, and mist nets to assess the diversity of the WMA over the course of three days. Only four permanent survey sites were established on the WMA (Figure 3): two located at differing wetlands and two in one grassland restoration site. Descriptions of the wetlands can be found in Campbell 2013. The grassland sites contained reptile box traps and drift fences and surveys were focused on assessing reptile assemblages within these habitats. Survey efforts at the two wetland sites were focused on determining amphibian assemblages and the phenology, orientation, and migration of pond breeding amphibians. The results of the phenological, orientation, and migration can be found in Campbell 2013. Other techniques used during survey efforts include, hoop nets, small pitfalls, coverboards, and harp traps.

**Figure 3**: The locations of all survey sites used during the inventory of Bear Hollow Mountain WMA.



Between 2005 and 2011, Wildlife Diversity personnel captured over 39,000 animals across the WMA. This capture total represents 80 species of amphibians, reptiles, small mammals, and bats (Table 1). The 17 species of greatest conservation need captured include: Barking Treefrog (*Hyla gratiosa*), Mountain Chorus Frog (*Pseudacris brachyphona*), Green Salamander (*Aneides aeneus*), Four-toed Salamander (*Hemidactylium scutatum*), Green Anole (*Anolis carolinensis*), Eastern Box Turtle (*Terrapene carolina*), Timber Rattlesnake (*Crotalus horridus*), Eastern Hog-nosed Snake (*Heterodon platirhinos*), Eastern Woodrat (*Neotoma floridana*), Golden Mouse (*Onchrotomys nuttalli*), Masked Shrew (*Sorex cinereus*), Pygmy Shrew (*Sorex hoyi*), Southeastern Shrew (*Sorex longirostris*), Rafinesque's Big-eared Bat (*Corynorhinus rafinesquii*), Gray Bat (*Myotis grisescens*), Eastern Small-footed Bat (*Myotis leibii*), and Indiana Bat (*Myotis sodalis*).

The high diversity of wildlife captured during the inventory of Bear Hollow Mountain WMA is representative of the heterogeneity of habitats located on the southern Cumberland Plateau. The escarpment creates habitat for species such as the Green Salamander, whereas through natural processes, the limestone geology has been transformed to create wintering habitat for species such as the Indiana and Rafinesque's Big-eared bat. Numerous streams are located on the WMA, forming on the top of the Plateau, where salamanders of the genera *Desmognathus* can be found. These streams flow into larger streams, such as Estill Fork, where gray bats forage during the summer months.

There are numerous habitats within the WMA and on the southern Cumberland Plateau that are important to a diverse number of wildlife, most that are widespread. The most important and lacking habitat, based on inventory efforts, are ephemeral wetlands. There are only 7 ephemeral wetlands that occur across the 17,000 acres of WMA. Inventory efforts were focused extensively on this habitat type at two permanent inventory sites. Fifty-five species of amphibian, reptile, and small mammal were captured during the study, 47 species at site 26007 and 41 species at site 26031. Thirty-six species of amphibians and reptiles were captured at site 26007 and thirty-one species of amphibians and reptiles were captured at site 26031. Ambystomatid salamanders accounted for 80% of the capture total at each site. The diversity of these two wetlands indicates the importance of this habitat type within the landscape.

**Table 1:** A list of species captured during the survey of Bear Hollow Mountain WMA.

| Common Name | Scientific Name | No. Captured |
|---|---|---|
| **Frogs and Toads** | | |
| Eastern Cricket Frog | *Acris crepitans* | 3 |
| Southern Cricket Frog | *Acris gryllus* | 9 |
| American Toad | *Anaxyrus americanus* | 1,328 |
| Fowler's Toad | *Anaxyrus fowleri* | 15 |
| Eastern Narrow-mouthed Toad | *Gastrophryne carolinensis* | 268 |
| Cope's Gray Treefrog | *Hyla chrysoscelis* | 66 |
| Barking Treefrog | *Hyla gratiosa* | 1 |
| American Bullfrog | *Lithobates catesbeianus* | 14 |
| Green Frog | *Lithobates clamitans* | 131 |
| Pickerel Frog | *Lithobates palustris* | 27 |
| Southern Leopard Frog | *Lithobates sphenocephalus* | 337 |
| Mountain Chorus Frog | *Pseudacris brachyphona* | 10 |
| Northern Spring Peeper | *Pseudacris crucifer* | 824 |
| Upland Chorus Frog | *Pseudacris feriarum* | 3 |
| Eastern Spadefoot | *Scaphiopus holbrookii* | 510 |
| **Salamanders** | | |
| Spotted Salamander | *Ambystoma maculatum* | 11,475 |
| Marbled Salamander | *Ambystoma opacum* | 13,083 |
| Mole Salamander | *Ambystoma talpoideum* | 5,812 |
| Eastern Tiger Salamander | *Ambystoma tigrinum* | 7 |
| Green Salamander | *Aneides aeneus* | 8 |
| Spotted Dusky Salamander | *Desmognathus conanti* | 15 |
| Northern Dusky Salamander | *Desmognathus fuscus* | 22 |
| Seal Salamander | *Desmognathus monticola* | 12 |
| Southern Two-lined Salamander | *Eurycea cirrigera* | 11 |
| Cave Salamander | *Eurycea lucifuga* | 1 |
| Spring Salamander | *Gyrinophilus porphyriticus* | 2 |
| Four-toed Salamander | *Hemidactylium scutatum* | 365 |
| Eastern Newt | *Notophthalmus viridescens* | 3,739 |
| Northern Slimy Salamander | *Plethodon glutinosus* | 31 |
| Southern Zigzag Salamander | *Plethodon ventralis* | 97 |
| Red Salamander | *Pseudotriton ruber* | 7 |

| **Skinks and Lizards** | | |
|---|---|---|
| Green Anole | *Anolis carolinensis* | 2 |
| Common Five-lined Skink | *Plestiodon fasciatus* | 12 |
| Broad-headed Skink | *Plestiodon laticeps* | 12 |
| Northern Fence Lizard | *Sceloporus undulatus* | 21 |
| Ground Skink | *Scincella lateralis* | 1 |
| **Turtles** | | |
| Eastern Snapping Turtle | *Chelydra serpentina* | 25 |
| Eastern Mud Turtle | *Kinosternon subrubrum* | 5 |
| Eastern Box Turtle | *Terrapene carolina* | 8 |
| **Snakes** | | |
| Copperhead | *Agkistrodon contortrix* | 89 |
| Eastern Wormsnake | *Carphophis amoenus* | 27 |
| Eastern Racer | *Coluber constrictor* | 87 |
| Timber Rattlesnake | *Crotalus horridus* | 15 |
| Ring-necked Snake | *Diapophis punctatus* | 7 |
| Eastern Hog-nosed Snake | *Heterodon platirhinos* | 14 |
| Milksnake | *Lampropeltis triangulum* | 1 |
| Northern Watersnake | *Nerodia sipedon* | 28 |
| Ratsnake | *Pantherophis alleghaniensis* | 16 |
| Red-bellied Snake | *Storeria occipitomaculata* | 4 |
| Eastern Gartersnake | *Thamnophis sirtalis* | 25 |
| Smooth Earthsnake | *Virginia valeriae* | 2 |

| Non-Volant Mammals | | |
|---|---|---|
| Northern Short-tailed Shrew | *Blarina brevicauda* | 41 |
| Least Shrew | *Cryptotis parva* | 7 |
| Virginia Opossum | Didelphis virginiana | 1 |
| Southern Flying Squirrel | *Glaucomys volans* | 2 |
| Prairie Vole | *Microtus ochrogaster* | 13 |
| Woodland Vole | *Microtus pinetorium* | 34 |
| Eastern Woodrat | *Neotoma floridana* | 3 |
| Golden Mouse | *Onchrotomys nuttalli* | 5 |
| Cotton Mouse | *Peromyscus gossypinus* | 8 |
| White-footed Mouse | *Peromyscus leucopus* | 82 |
| Deer mouse | *Peromyscus maniculatus* | 12 |
| Eastern Harvest Mouse | *Reithrodontomys humulis* | 3 |
| Hispid Cotton Rat | *Sigmodon hispidus* | 44 |
| Masked Shrew | *Sorex cinereus* | 1 |
| Pygmy Shrew | *Sorex hoyi* | 4 |
| Southeastern Shrew | *Sorex longirostris* | 8 |
| Eatern Cottontail | Sylvilagus floridanus | 2 |
| Eastern Chipmunk | *Tamias striatus* | 8 |
| **Volant Mammals** | | |
| Rafinesque's big-eared bat | *Corynorhinus rafinesquii* | 3 |
| Big brown bat | *Eptesicus fuscus* | 1 |
| Eastern red bat | *Lasiurus borealis* | 102 |
| Hoary bat | *Lasiurus cinereus* | 4 |
| Gray bat | *Myotis grisescens* | 3 |
| Eastern small-footed bat | *Myotis leibii* | 5 |
| Little brown bat | *Myotis lucifugus* | 2 |
| Northern long-eared bat | *Myotis septentrionalis* | 34 |
| Indiana bat | *Myotis sodalis* | 13 |
| Evening bat | *Nycticeius humeralis* | 9 |
| Tri-colored bat | *Perimyotis subflavus* | 84 |
| | **Total Captured** | 39,172 |

Yellow denotes species of greatest conservation need.

**Future Management**

Currently, management has been restricted to areas where timber harvests occurred prior to the Tennessee Wildlife Resources Agency acquiring ownership of the land. The goal of management within these areas is to create grassland and early succession habitat. Lands managers have used prescription fire to slowly re-establish this habitat on the WMA. Heavy equipment has been used to create firebreaks as well as clear large, dense woody vegetation within these areas where fire was becoming ineffective.

Because of the expanse of the WMA, diversity of habitats, and extreme topography, it is unlikely management will extend beyond the current footprint. Management should seek to protect important habitats harboring high levels of diversity, such as ephemeral wetlands. Loss of this habitat across the WMA may cause catastrophic loss of pond breeding amphibian populations.

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